

## Pepco - District of Columbia

### Smart Grid Project

#### Abstract

The Pepco – District of Columbia Smart Grid project in Washington, DC, includes distribution automation, advanced metering infrastructure (AMI), and demand response programs that involve load control devices and time-based rate programs. The AMI installation is designed to provide customers and Pepco with detailed electricity usage information, which, when combined with the demand response programs, helps customers reduce electricity usage and peak demand. The distribution automation deployment includes substation smart devices, automated distribution circuit reclosers/switches, network and substation transformer monitors that improve the reliability of the distribution system while decreasing operations and maintenance costs.

#### Smart Grid Features

**Communications infrastructure** involves components of the wireless AMI mesh network. The system has the capability to route traffic through the AMI meters, and Pepco is designing the system to route distribution automation traffic through battery-backed wireless communications devices. This approach ensures that distribution automation traffic remains on energized communications devices during power outages. The system uses the same backhaul communications systems to transport AMI and distribution automation data to the appropriate end points.

**Advanced metering infrastructure** includes the installation of 270,000 smart meters across Pepco's entire Washington, DC service territory. These meters can be used by Pepco to detect power outages and provide notification. AMI supports demand response, load control, and time-based rate programs, and reduces the cost of meter operations.

**Advanced electricity service options** offered through the project include a Web portal for electric customers to access their consumption data and programmable communicating thermostats. The Web portal allows customers to view the data collected from their smart meters, giving them information on the amount and timing of their electricity usage, and the costs. The Web portal also provides the platform for customers to view and control the programmable communicating thermostats.

#### At-A-Glance

Recipient: Pepco Holdings, Inc.

State: Washington, DC

NERC Region: ReliabilityFirst Corporation

Total Budget: \$92,753,369

Federal Share: \$44,580,549

Project Type: Integrated and/or Crosscutting Systems

#### Equipment

- 270,000 Smart Meters
- AMI Communication Systems
  - Meter Communications Network
  - Backhaul Communications
- Meter Data Management System
- Customer Web Portal
- 25,250 Air Conditioner Direct Load Control Devices
  - Programmable Communicating Thermostats
  - Outdoor Cycling Switches
- Distribution Automation Equipment for 19 out of 779 Circuits
  - Distribution Automation Communications Network
  - Control of 76 Automated Distribution Circuit Reclosers/ Switches
  - 41 Network Transformer Monitors
  - 14 Transformer Health Sensors/Monitors
  - Upgrading 9 Substations with smart devices

#### Time-Based Rate Programs

- Peak-Time Rebate

#### Key Targeted Benefits

- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Equipment Failures and Theft
- Reduced Greenhouse Gas and Criteria Pollutant Emissions
- Reduced Meter Reading Costs
- Reduced Operating and Maintenance Costs

**Pepco Holdings, Inc.-DC** (continued)

**Direct load control devices** deployed by the project allow Pepco to cycle off and on air conditioner control equipment during peak demand periods and system emergencies in the summer months. In addition to helping Pepco manage overall system demand, the 25,250 load control devices also helps customers manage their electricity costs.

**Time-based rate programs** include customer options to enroll in time-of-use programs. The time based rate program is aimed at encouraging participating customers to shift their consumption from on-to off-peak periods, thus reducing peak demand and lowering Pepco’s operating costs.

**Distribution automation systems** includes new automated feeder reclosers /switches and associated controllers, electronic substation relays, substation Distributed Remote Terminal Units (DRTU), and Automatic Sectionalizing and Restoration (ASR) programs. These devices work together to detect and isolate faults more precisely, and reduce the number of customers affected by the power outage. Distribution automation includes installation of network transformer protector monitors, which provide real-time transformer status information such as phase currents, transformer loadings, and power factors. The project also includes installation of on-line dissolved gas analysis monitors on substation transformers. These devices monitor fault gases and other key parameters for timely assessments of transformer conditions. Together, these distribution automation technologies help improve reliability and operational efficiency.

**Timeline**

Key Milestones	Target Dates
AMI installation start	Q3 2010
Distribution automation installation start	Q2 2010
Direct load control devices installation start	Q2 2012
AMI installation complete	Q1 2013
Distribution automation installation complete	Q4 2013
Direct load control devices installation complete	Q4 2013

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